



Risk Mitigation Options to Address Inhalation Exposures from Soil Fumigant Applications

(http://www.epa.gov/oppsrrd1/reregistration/soil_fumigants/risk_mitigation.htm)

May 2, 2007

This fact sheet summarizes risk mitigation options that EPA is considering for a group of soil fumigant pesticides. The Agency's complete risk mitigation options paper is available in each of the soil fumigant pesticide dockets. Questions and other information below will assist stakeholders in providing the Agency useful information during a public comment period. Comments are due to EPA by November 3, 2007.

As part of the Agency's ongoing program to ensure that registered pesticides meet current health and safety standards, EPA has released for public comment the revised risk assessments, benefits assessments, and risk mitigation options for the following soil fumigants. EPA's goal in reviewing these pesticides is to reduce worker and bystander exposure below levels of concern, while maintaining effective and economical use for agriculture.

- methyl bromide (MeBr)
- metam sodium/potassium
- dazomet
- chloropicrin (Pic)
- 1,3-dichloropropene (1,3-D or Telone)

Although the Agency completed a reregistration eligibility decision (RED) for 1,3-D or Telone in 1998, this pesticide is being assessed with the other soil fumigants for comparative purposes. EPA does not expect any need for additional risk mitigation solely for 1,3-D. However, many of the products that contain 1,3-D also contain chloropicrin, and the Agency may require measures to mitigate the risks of chloropicrin use. Furthermore, many of the mitigation options being considered for the other fumigants are generic in nature and would enhance the safety of all soil fumigants, including 1,3-D (e.g., site-specific fumigant management plans, notification, record keeping, etc.).

Background

Fumigant Properties and Uses

Soil fumigants are either volatile chemicals that become gases at relatively low temperatures, around 40 degrees Fahrenheit, or they are chemicals that react to produce such a gas (e.g., methyl isothiocyanate or MITC). Soil fumigants are used to control a wide range of pests including insects, nematodes, fungi, bacteria, and weeds.

Agricultural Benefits and Bystander Risks

Because of the broad range of pests controlled, soil fumigants are used as part of the production of a wide variety of crops and provide high benefits for many growers. As gases, however, fumigants move from the soil to the air at the application site and may pose risks to bystanders who are exposed to airborne residues that drift off-site. Bystanders are people who are not involved in the fumigant application but who live, work, or are located in nearby areas where they may be exposed to airborne residues emitted from the application site. Bystanders include agricultural workers in nearby fields who are not involved with the fumigant application. Incidents of bystander exposure confirm that fumigants

have the potential to move off-site at concentrations which produce adverse health effects in humans.

Risk Mitigation Options

This fact sheet summarizes the risk management options that EPA has discussed fully in Risk Mitigation Options to Address Bystander and Occupational Exposures from Soil Fumigant Applications, Document number EPA-HQ-OPP-2005-0123-0282. The complete document may be found in the dockets for each of the soil fumigants. It outlines the options that EPA is considering to address all risks, but focuses on the acute human inhalation risks that have been identified in the revised risk assessments for these fumigants.

EPA seeks public comment on these risk mitigation options, particularly comments addressing cost, feasibility, and effectiveness. The Agency has provided a series of questions for the public to consider in preparing comments. Most of the measures described in the options paper could be applicable to all of the soil fumigants (e.g., fumigant management plans). However, some options apply only to one or a few fumigants (e.g., water application for MITC-generating fumigants).

How to Submit Comments

Comments will be accepted on soil fumigant risk mitigation options until November 3, 2007. All comments should be identified by the relevant docket ID number, which EPA has established for these actions:

EPA-HQ-OPP-2005-0123 for Methyl Bromide
EPA-HQ-OPP-2005-0124 for

1,3-Dichloropropene

EPA-HQ-OPP-2005-0125 for Metam Sodium/
Potassium

EPA-HQ-OPP-2005-0128 for Dazomet

EPA-HQ-OPP-2007-0350 for Chloropicrin

Publicly available docket materials are available either in the electronic docket, [Regulations.gov](http://www.regulations.gov), or in hard copy at the Office of Pesticide Programs (OPP) Regulatory Public Docket.

Comments may be submitted by one of the following methods:

- **Regulations.gov** (Open a fumigant docket and find the docket item for the May 2, 2007 Federal Register Notice soliciting risk reduction options. In the far right column titled Add Comments, select the yellow balloon icon and follow on-screen directions. This icon will only be functional during the comment period.);
- **Mail** (Office of Pesticide Programs Regulatory Public Docket (7502P), Environmental Protection Agency, 1200 Pennsylvania Ave., NW, Washington, DC 20460-0001); or,
- **Hand delivery** (During normal hours of operation, 8:30 a.m. to 4 p.m., Monday through Friday, excluding legal holidays, deliver comments to OPP Regulatory Public Docket (7502P), Environmental Protection Agency, Rm. S-4400, One Potomac Yard (South Building), 2777 S. Crystal Drive, Arlington, VA 22202).

Please do not e-mail or fax your comments. For questions or assistance in submitting comments, contact the OPP Regulatory Public Docket at (703) 305-5805.

For More Information about Soil Fumigants

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Proposed Risk Management Options for Soil Fumigants

Mitigation Measures That Would Directly Reduce Potential Acute Inhalation and Other Risks

Options one through eight could all reduce occupational exposures, however options five, six, and seven focus specifically on occupational exposures.

1. **Buffer Zones:** Establishing a buffer zone around a treated field is an effective method for managing the risks from acute inhalation exposure to bystanders. The distance between the application site (i.e., edge of field) and the bystanders allows airborne residues to disperse before reaching the bystanders. The greater the distance, the greater the potential for residues to disperse, thus decreasing the likelihood that air concentrations where bystanders are located will cause acute adverse health effects.

EPA's goal is to determine distances, or buffer zones, which will adequately protect bystanders from acute exposures, but which are not so great as to eliminate benefits of soil fumigant use. The distance or size of the buffer zones would be based on several factors that include:

- application rates;
- field size;
- application equipment and methods;
- and
- emission control measures (e.g., tarps).

Air monitoring data, incident reports, and air dispersion modeling based on these factors can be used to help determine protective buffer zones distances. Buffer zone distances could be fixed (e.g., 500 feet) or scenario-based using applicable site conditions (based on look-up tables).

2. **Sealing Methods:** In some cases the use of certain tarps (e.g., high barrier films) might significantly reduce the size of buffer zones because tarps can retain fumigants in the treated soil for longer periods than fields treated without tarps. Applying water immediately following an application (and in some cases again intermittently thereafter) is another sealing method that is used predominately with the MITC-generating fumigants to reduce emissions. Other sealing methods such as using rollers or other specialized application equipment (e.g., Yetter rigs) to close the chimney

created by the injection knives and compact the soil immediately after injecting fumigants, and using soil amendments to form a reactive layer on the soil surface may also be effective methods for reducing emissions.

3. **Timing of Applications:** Generally, less stable atmospheric conditions occur during the daylight hours and therefore dissipate the fumigant more rapidly than more stable night time conditions. Application time restrictions in some cases could help ensure that periods of peak emissions do not coincide with stable atmospheric conditions occurring at night.
4. **Application Block Limits:** The potential exists for bystander exposure from multiple treated fields that are adjacent to each other or lie within the same vicinity, if the fields are treated at the same time. The size of application block (along with other factors) has a direct impact on the inhalation risks for bystanders. Restrictions on the size of an application block treated and proximity of multiple application blocks could reduce bystander inhalation risks.
5. **Respiratory protection:** There are risk concerns for several handler scenarios when no respiratory protection is used. Handlers are defined as all persons involved with the application of the fumigant including those persons involved in tarp cutting and removal activities. In some cases inhalation risks can be mitigated with the use of air purifying respirators equipped with approved respirator cartridge filters. However, for scenarios involving air concentrations where these respirators do not provide adequate protection or where no approved respirator filter exists, the use of a self-contained breathing apparatus (SCBA) may be required to adequately reduce the risks to handlers.
6. **Tarp Cutting and Removal:** Fumigant gases that may be trapped under the tarp can be released when the tarp is cut, particularly when high barrier films are used.

Handlers cutting and removing tarps may be exposed to air concentrations that exceed the Agency's level of concern. The Agency is considering requiring the following:

- a minimum time between application and tarp cutting (e.g., 7 to 10 days);
- use of respiratory protection; or
- use of mechanical devices (e.g., using all-terrain vehicles with cutting implements attached).

In addition, if tarps are to be removed within 14 days of a fumigation treatment, the Agency is considering the requirement that tarps be cut (but not removed) at least 24 hours prior to tarp removal. These measures may minimize handler exposure to remaining fumigant vapors trapped under tarps.

7. **Entry-Restricted Period:** The current entry-restricted period for soil fumigants ranges from two to five days. All persons, including agricultural workers who are not involved in the application and tarp removal, are

prohibited from entering the treated area during these periods. In most cases the majority of fumigant mass applied using no tarp or under conventional tarps is emitted during the first 48 hours of an application. However in some cases, the fumigants being emitted from the treated field may take much longer (up to a week) to fully off-gas. For these situations, the Agency is considering lengthening current entry-restricted periods until air concentrations in the treated area decline to levels that will not exceed the Agency's level of concern.

8. **Application Method/Practice Restrictions:** The Agency is considering prohibiting certain application methods and/or practices that have been shown to have high emission potential or that can lead to risks that exceed the Agency's level of concern (e.g., overhead sprinkler irrigation under certain application conditions). EPA may also prohibit application methods where adequate emissions data are not available to estimate exposure if other information (e.g., history of incidents) raises concern.

Mitigation Measures that would Facilitate and Ensure Compliance, Enforcement, and Planning

1. **Site-specific Fumigation Management**

Plans: There is risk reduction value in encouraging fumigators to anticipate, recognize, and evaluate the factors that could lead to bystander exposures that are of concern. A valuable supplement to other requirements is a comprehensive site-specific fumigant management plan. Soil fumigation applications are complex operations, and to ensure that all label requirements are met, EPA believes that Fumigation Management Plans are necessary for adequate planning, compliance, and to ensure enforcement.

Elements that the Agency believes should be included in a comprehensive soil Fumigation Management Plans are described in the full options paper. In addition to helping ensure fumigators successfully plan all aspects of a safe fumigation, Fumigation Management Plans will be a tool for federal, state, and local officials to ensure compliance with labeling and regulations associated with soil fumigations.

2. **Responsible Party:** For each fumigation event, the Agency is considering requiring a clear identification of the party responsible

for ensuring compliance with label requirements and safety of the application. In many cases, handler activities other than the application (e.g., water application, tarp repair, tarp removal, etc.) are conducted after commercial fumigators have left the application site. The responsible party and their applicable duties that may impact their own risk as well as other handlers, agricultural workers, and bystanders would need to be identified (e.g., in the Fumigation Management Plan).

3. **Certification of Fumigation Management Plans:** The Agency is considering requiring that the person supervising the fumigation, or the responsible party, certify in writing that he/she has reviewed the Fumigation Management Plan and that it addresses all elements required by product labels, and that all decisions on the fumigation processes (e.g., buffer zones and PPE) are appropriate and protective.

EPA is also considering allowing state or local governments the option of implementing their own Fumigation Management Plan certification process, or allowing fumigators to either self-certify or

contract a third-party for Fumigation Management Plan certification. The Agency believes that since most states do not have an infrastructure like California's with county agricultural commissioners, this option of allowing self- or third-party certification becomes an important compliance assurance tool and can be potentially implemented without placing the burden of reviewing Fumigation Management Plans on states that choose not to assume the burden.

4. **Record Keeping, Reporting, and Tracking:** There are currently no requirements on EPA labels for applicators or growers to keep records of applications made. However, many fumigants are restricted-use products and certain records must be kept. Reporting and tracking of applications as part of a site-specific Fumigation Management Plan could be a major tool for federal, state, and local regulators to ensure compliance with labeling and regulations associated with soil fumigations.
5. **Notification and Posting:** If buffer zones are used, bystanders will need to be informed about the location and timing of the fumigation to ensure they do not enter areas designated as part of the buffer zone. Furthermore, EPA believes that bystanders not involved in the fumigation could take other steps to protect themselves if they were aware of potential risks associated with soil fumigations that are occurring near where they live and work. This can be accomplished by posting signs, as well as through other communication methods (e.g., oral and/or written notification).

Providing access to site-specific fumigation management plans is one option that may be used to convey useful information to potential bystanders. The Agency recognizes that some of the information in the Fumigation Management Plans may be confidential, or not useful to neighbors. The options paper lists examples of critical information that must be communicated to all bystanders.

6. **Restricted Use Pesticides:** All soil fumigant products containing methyl bromide, 1,3-D, and chloropicrin are currently restricted use pesticides. Soil fumigant products containing metam sodium/potassium and dazomet are not currently restricted use pesticides. The Agency is considering making all of the soil fumigants restricted use pesticides based on several factors that are described in the options paper (e.g., many of the fumigants or fumigant byproducts are acutely toxic and trigger restricted use pesticide classification).
7. **Good Agricultural Practices:** The Agency believes requiring good agricultural practices to be included on labels (e.g., soil preparation/tilling, target moisture content, temperature, "sealing" and/or surface compaction, weather criteria, etc.) will minimize inhalation and other risks from fumigant applications. Several fumigant products already incorporate some of these measures on their labels.
8. **Soil Fumigation Manual:** The Agency is considering developing a manual to provide guidance to fumigators, growers, and other stakeholders on how to conduct soil fumigations that are in compliance with EPA labels. The manual could potentially include guidance on how to determine buffer zones with site-specific modeling and monitoring data. As previously mentioned, scenario based buffer zones involve some complexity that will require growers, applicators, and other stakeholders to be adequately educated on the requirements of the EPA labels.
9. **Stewardship Program:** The Agency is considering requiring fumigant registrants to conduct a stewardship program independently or together with the other fumigant registrants. Elements that may be included are described in the full options paper (e.g., elements: educational and training materials designed to educate workers regarding work practices that can reduce exposure to fumigants, development of channels for disseminating these training materials, a description of how and who will conduct the training, etc.).

Proposed Risk Management Options for Soil Fumigants – Questions for Commenters

General Questions on the Options

1. Which fumigant(s), geographic region(s), and crop(s) do your comments address?
2. What is the feasibility of implementing this option on a national level?
3. What are the economic costs and impacts associated with this option? (e.g., to crop production)
4. How effectively would this option mitigate the acute inhalation and other risks associated with soil fumigant applications?
5. Are there alternative approaches to this option? If so, please describe and include the rationale for your alternate approach.

Questions on Buffer Zones

1. Please estimate the quantitative impacts of requiring buffer zones set at the following distances: 100 feet, 100 to 300 feet, 300 to 500 feet, 500 to 1,000 feet, ¼ to ½ mile, and greater than ½ mile.
2. As part of the explanation of these impacts, please discuss how the buffer zone distances listed above would change crop production practices (fumigation schedules and size of treated fields, crop yields) and what would be the associated costs?
3. What are the costs of leaving areas untreated as a result of the buffer zones (e.g., fields near homes)?
4. What are the costs of subdividing application blocks to achieve workable buffers?
5. To the extent possible, describe what buffer zone distance is not feasible and why.
6. Please discuss what you would do if new EPA restrictions made it impractical to continue using the fumigant you are currently using. Please identify the next best alternative(s) to your current practice and what costs would be associated with shifting to alternatives?
7. Growers in California and Wisconsin are asked to comment on the transition process from having no buffers to having buffers. Also, please provide comments related to cost and feasibility of situations where bystanders voluntarily moved while buffer zones were in effect to comply with buffer zone requirements.
8. How could you modify practices to get a smaller buffer? Growers in California, please comment on modifications that you have made to achieve smaller buffer zones.
9. Growers and/or other stakeholders, please comment on the proximity (e.g., in meters or

- feet) of residential or other occupied areas that are located near fields that are treated with soil fumigants. Please comment on the density of these areas within the proximity of application blocks (i.e., 1 or 2 homes or subdivisions of multiple houses).
10. Specify whether fumigated sites are owned or leased by growers.
 11. If scenario-based buffer zones were required by the Agency, please provide increments of application rates and field sizes that should be reflected in buffer zones look-up tables.
 12. Are there any additional exemptions that the Agency should consider?
 13. What information should be included on a written commitment from adjacent property owners?
 14. What form should it take?
 15. Will having both inner and outer buffer zones be practical and feasible?
 16. Are there areas not identified above that should be considered to be sensitive sites?
 17. Growers and other stakeholders are asked to comment on the distance of sensitive sites to fields that are currently being fumigated.

Questions on Sealing Methods

1. Are there other additional data or citations for data and information related to emission reduction or pest control not listed in the risk assessments or Appendix B?
2. For growers that are currently using one or more of these tarps, how did the use of these tarps affect rates or efficacy? Please specify the fumigant you applied and whether you used LDPE, HDPE, high barrier films, or metalized tarps.
3. Growers that are not using these tarps and researchers, please provide comments on the feasibility of using tarps or upgrading to tarps that have increased emission control. Also include information on effect of tarps on rates and efficacy.
4. Growers, please comment on potential problems with disposing of used tarps, including cost and availability of tarps. Are there any fees/costs associated with disposal in your area? Are there any recycling programs for tarp materials?
5. EPA understands that historically there have been problems with gluing VIF sections together. Have newer generation VIF tarps, metalized tarps, and glues addressed this problem?

6. For what types of application methods would water applications effectively reduce off-site emissions?
7. Can water applications be effectively used to reduce emission from other fumigants besides the MITC-generating fumigants?
8. Is irrigation equipment available for all crops for which metam sodium/potassium is used?
9. If irrigation equipment is available, please describe the associated costs.
10. For which fumigants can compaction sealing effectively be used to reduce emissions? To the extent possible, please cite supporting data and/or references.
11. When compaction is used, please provide a detailed description of the process (e.g., rollers or other devices); amounts of pressure needed; limitations based on soil type; moisture content; and injector type/depth.

Questions on Application Block Limits

1. How could fumigators, fumigant distributors, and/or growers ensure that nearby growers are not fumigating within the same time frames?
2. Please describe scenarios that require application blocks of greater than 40 acres. For these scenarios, would it be feasible subdivide the application blocks into smaller areas, to be treated on different days?
3. Please estimate the quantitative impacts of limiting application blocks to the following sizes: 40 acres, 40 to 60 acres, 60 to 80 acres, and greater than 80 acres.

Questions on Respiratory Protection

1. To what extent are workers who are currently required to wear respirators fit-tested, medically qualified, and trained? Please specify if fit testing is qualitative or quantitative.
2. What procedures, if any, should the EPA require to ensure that workers who are required to wear respirators are fit-tested, medically qualified, and trained (e.g., require on all labels, recordkeeping, etc.)?
3. Fumigators or growers, please describe what air monitoring is currently performed during and after each fumigation application. Please also include measurement method(s) as well as LOQ.

Questions on Entry-Restricted Period

1. What post-application activities are performed within the 7 to 10 day period following fumigant applications?

2. What impact, if any would result from extending the current entry-restricted period?

Question on Site-Specific Fumigation Management Plans (FMPs)

1. Besides California where worksite plans are required to obtain a permit, to what extent are fumigators currently using FMPs?

Questions on Responsible Party

1. Should the fumigator/applicator be the responsible party for all aspects of the fumigant application process in regard to label requirements including tarp cutting and removal?
2. What are the pros and cons of allowing the responsible party duties to be shared among different parties (e.g., fumigator, growers, and other parties)?

Questions on Notification and Posting

1. What information not listed above should be provided to potential bystanders? Include rationale for providing information.
2. Who should be notified prior to applications?
3. Where and when should notification be given?
4. How often should notification be given?
5. What is the best way to provide this information?

Questions on Good Agricultural Practices

1. The Agency requests specific examples of (1) information where the employment of GAPs would have prevented incidents, (2) GAP risk reduction options, as well as (3) ways to make sure GAPs are followed. For example, ways to ensure that: the application does not begin at a calm period; the applicator does not fumigate the soil at too hot of a temperature; the soil is properly prepared and free of clods; the soil has proper moisture; end row spillage does not occur; proper discing/cultipacking is performed; beds are properly formed; end-guns are turned off for center-pivot applications; and, for sprinkler applications, nozzle heights are as low as is feasible.
2. Should GAPs apply to all, or only some, of the fumigants?
3. What changes, if any, would result if GAPs were required?
4. Should GAPs be advisory or mandatory?